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10/054,272	01/22/2002	William J. O'Kane	S01.12-0857/STL 10324	6304

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06/24/2004

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EXAMINER

KLIMOWICZ, WILLIAM JOSEPH

ART UNIT	PAPER NUMBER
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2652

DATE MAILED: 06/24/2004

9

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/054,272

Applicant(s)

O'KANE ET AL.

Examiner

William J. Klimowicz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 2,6,7,10-19 and 24-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-5,8,9 and 20-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 7.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

This application contains claims 2, 6, 7, 10-19 and 24-26 drawn to an invention nonelected with traverse in the reply filed on November 3, 2003 (Paper No. 5). A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 20 is rejected under 35 U.S.C. 102(e) as being anticipated by Niwa (US 2001/0015871 A1).

As per claim 20 (and claim 1, rejected, *infra*), Niwa (US 2001/0015871 A1) discloses a method of forming a narrow writer pole (3\_1) of a write element (10), the method comprising steps of: (a) forming a non-magnetic layer (e.g., 2); (b) forming a writer pole portion (3\_1) on the non-magnetic layer (2) having first and second side walls (3\_2) which define a width of a magnetically active region, the width of the magnetically active region defining a track width of the write element (10); and (c) transforming the first side wall into a magnetically dead side wall

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(regions 3\_2) thereby reducing the width of the magnetically active region (to a region between regions (3\_2)) and the track width of the write element by a thickness of the magnetically dead first side wall (e.g., see FIG. 6). That is, the ions are injected at an angle into the pole (3); as shown in FIG. 7, initially one side is injected with the ions prior to the other side, thus producing a magnetic dead side wall, at one side, as per claim 21. Thus, at least initially, only one side wall is exposed, prior to the other side wall being exposed.

Moreover, as per claim 20, step (c), the ion implantation as disclosed by Niwa (US 2001/0015871 A1) results in reducing the initial width of the magnetically active region without reducing the width of the writer pole portion (3) - see paragraph [0082].

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-5, 8, 9 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niwa (US 2001/0015871 A1) in view of Kunieda (JP 54-140505 A).

See the description of Niwa (US 2001/0015871 A1), *supra*.

Additionally, as per claim 3, the formation of step (b) is performed in accordance with at least one process selected from a group consisting of sputter deposition, photolithography, etching, milling, and electroplating (i.e., "plating") - see, *inter alia*, paragraphs [0080-0081].

As per claims 4 and 22, wherein the transforming step (c) is performed in accordance

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with at least one process selected from a group consisting of irradiation and ion implantation - see, *inter alia*, paragraphs [0082].

As per claim 9, wherein the writer pole (3) is either a top pole or a bottom pole of the write element (e.g., see FIGS. 2 and 3).

As per claims 1 and 21, Niwa (US 2001/0015871 A1) does not expressly disclose wherein the implanted ion is an element having an atomic weight of less than or approximately equal to that of argon (Ar).

Kunieda (JP 54-140505 A), however, teaches the express advantages of ion implanting such an element (Ar) into a magnetic material (2) to obtain a nonmagnetic surface layer (3). Such an advantage includes improving the corrosion resistance and durability, without degrading the remnant underlying magnetic thin film (2). See abstract of Kunieda (JP 54-140505 A). Additionally, the Examiner is in the process of securing an English-language translation of Kunieda (JP 54-140505 A) to further buttress this position.

Moreover still, as per claims 5 and 23, although Niwa (US 2001/0015871 A1) remains silent concerning wherein an element used in ion implantation is selected from a group consisting of nitrogen, argon, boron, phosphorous, and gallium, Official notice is taken that ion implantation utilizing an ion of nitrogen, argon, boron and phosphorous is notoriously old and well known and ubiquitous in the art; such Officially noticed fact being capable of instant and unquestionable demonstration as being well-known.

This Officially noticed fact, previously taken in the First Office action on the merits, is satisfied by the showing and teaching of Kunieda (JP 54-140505 A), *supra*.

It would have been obvious to one of ordinary skill in the art at the time the invention

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was made to use as the ion implantation disclosed by Niwa (US 2001/0015871 A1), an ion selected from the group consisting of nitrogen, argon, boron and phosphorous as is known, as expressly taught and suggested by Kunieda (JP 54-140505 A).

The rationale is as follows: one of ordinary skill in the art would have been motivated to use as the ion implantation disclosed by Niwa (US 2001/0015871 A1), an ion selected from the group consisting of nitrogen, argon, boron, phosphorous, and gallium, as is known, in order to provide a selected depth and rate of ion implantation, consistent with the overall teachings of Niwa (US 2001/0015871 A1) to reduce writer pole width via introduction of ions into portions of the writer pole, while providing the advantageous results of improving the corrosion resistance and durability, without degrading the remnant underlying magnetic thin film.

No new or unobvious result is seen to be obtained by utilizing one prescribed ion for another; the general teaching of Niwa (US 2001/0015871 A1) is to use ions via ion implantation into a magnetic writer pole to reduce the writer pole width, creating dead zones (i.e., non-magnetic zones) that exist via the ion implantation process, irrespective of a particular ion.

As per claim 8, although Niwa (US 2001/0015871 A1) remains silent with respect to the forming step (b) as including: (b)(1) forming photoresist dams on the non-magnetic layer; (b)(2) forming the writer pole portion between the photoresist dams; and (b)(3) removing the photoresist dams, Official notice is taken that such a method of forming a writer pole via "frame plating" is notoriously old and well known and ubiquitous in the art; such Officially noticed fact being capable of instant and unquestionable demonstration as being well-known.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the writer pole of Niwa (US 2001/0015871 A1) via such a "frame plating"

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method, as articulated in claim 8, as is known.

The rationale is as follows: one of ordinary skill in the art would have been motivated to form the writer pole of Niwa (US 2001/0015871 A1) via such a "frame plating" method, as articulated in claim 8, as is known, in order to form the writer pole of Niwa (US 2001/0015871 A1) in a batch yield manner, wherein many heads can be simultaneously formed on a wafer utilizing a process which lends itself to high precision and large yield rates, as is well known, established and appreciated in the art.

### *Response to Arguments*

Applicants' arguments filed March 15, 2004 (Paper No. 8) have been fully considered but they are not persuasive.

The Applicants allege that:

Independent claim 1 has been amended to describe a step of "implanting an element having an atomic weight of less than or approximately equal to that of argon (Ar) into the first side wall to thereby transform the first side wall into a magnetically dead side wall and reduce the width of the magnetically active region and the track width of the write element by a thickness of the magnetically dead first side wall.." Applicant submits that such a step is neither taught nor suggested by the cited reference.

See Applicants' comments at page 7 of Paper No. 8 (Amendment B) filed March 15, 2004.

The Examiner maintains that, as per claims 1 and 21, Niwa (US 2001/0015871 A1) admittedly does not expressly disclose wherein the implanted ion is an element having an atomic weight of less than or approximately equal to that of argon (Ar).

Kunieda (JP 54-140505 A), however, teaches the express advantages of ion implanting such an element (Ar) into a magnetic material (2) to obtain a nonmagnetic surface layer (3).

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Such an advantage includes improving the corrosion resistance and durability, without degrading the remnant underlying magnetic thin film (2). See abstract of Kunieda (JP 54-140505 A).

Additionally, the Examiner is in the process of securing a full English-language translation of Kunieda (JP 54-140505 A) to further buttress this position.

Moreover still, as per claims 5 and 23, although Niwa (US 2001/0015871 A1) remains silent concerning wherein an element used in ion implantation is selected from a group consisting of nitrogen, argon, boron, and phosphorous, Official notice was previously invoked, whereby the Examiner maintained that ion implantation utilizing an ion of nitrogen, argon, boron and phosphorous was notoriously old and well known and ubiquitous in the art; such Officially noticed fact being capable of instant and unquestionable demonstration as being well-known.

This Officially noticed fact, previously taken in the First Office action on the merits, and timely challenged by the Applicants in Paper No. 8, at page 9, is satisfied by the showing and teaching of Kunieda (JP 54-140505 A), *supra*.

More specifically, the Examiner maintains that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the ion implantation disclosed by Niwa (US 2001/0015871 A1), an ion selected from the group consisting of nitrogen, argon, boron and phosphorous as is known, as expressly taught and suggested by Kunieda (JP 54-140505 A) in order to provide a selected depth and rate of ion implantation, consistent with the overall teachings of Niwa (US 2001/0015871 A1) to reduce writer pole width via introduction of ions into portions of the writer pole, while providing the advantageous results of improving the corrosion resistance and durability, without degrading the remnant underlying magnetic thin film as expressly espoused by Kunieda (JP 54-140505 A).



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The Applicants further argue at page 7 bridging page 8 of Paper No. 8:

In particular, Niwa only discloses the injection of relatively heavy elements (niobium (Nb) having an atomic weight of 92.90638, chromium (Cr) having an atomic weight of 51.9961, and zirconium (Zr) having an atomic weight of 91.224) to reduce the magnetic width of the head 10 [0072]. Additionally Niwa discloses that the elements are injected to a depth of approximately 150 nm or 200 nm when injected vertically with respect to the surface at an energy of 300 KeV or 400 KeV, respectively [0087]. The injection of the relatively heavy elements of Niwa into the magnetic structure at such high energy levels etches or erodes the structure thereby changing its physical shape. Such shape changes can adversely affect the ability to control the demagnetization of the structure due to the continuously changing dimensions of the structure. Furthermore, the modifications to the physical structure can effect subsequent processes that complete the formation of the write element.

See also page 8, whereby Applicants state:

Independent claim 20 is directed to a method of forming a writer pole or a write element that includes a step of "reducing the initial width of the magnetically active region without reducing the width of the writer pole portion." Applicant submits that Niwa fails to teach or suggest such a method. Instead, as described above, the method of Niwa causes the magnetic structure to erode due to the high atomic weight of the elements and the high energy level at which they are injected into the magnetic structure, thereby changing its physical width.

The Examiner maintains that the Applicants' allegation that the ion implantation teaching of Niwa (US 2001/0015871 A1) somehow physically changes the shape of the actual width of the poles of Niwa (US 2001/0015871 A1) has absolutely no basis in fact whatsoever. The Applicants characterization of Niwa (US 2001/0015871 A1), as an ion implantation which physically changes the shape of the pole by "etching" is completely diametrically opposed to the disclosure and invention of Niwa (US 2001/0015871 A1). That is Niwa (US 2001/0015871 A1) teaches an ion implantation method to create magnetically dead edge regions along a magnetic sidewall, without physically altering the width of the pole. See, *inter alia*, e.g., paragraph

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[0069], in which Niwa (US 2001/0015871 A1) discloses unambiguously and in no uncertain terms:

The magnetic width [as opposed to the actual or physical width] of the magnetic head 10, which is represented by the width of the upper soft-magnetic region 3\_1, ***is smaller than the actual width of the tip of the upper magnetic pole 3***, since the tip of upper magnetic pole 3 is demagnetized from both of the side walls to the respective predetermined depths by injecting impurity as described above. Since the region of the magnetic head 10 where a magnetic field is generated is defined by the magnetic width [as opposed to the actual or physical width], then the magnetic head 10 has a very narrow core width.

Emphasis in bold italics added; bracketing comments are Examiner's. Clearly, the Applicants' allegation of the impurity somehow reducing the actual or physical width of the pole of Niwa (US 2001/0015871 A1) is without merit and completely unsubstantiated based on the facts and evidence, as disclosed by Niwa (US 2001/0015871 A1).

For the foregoing reasons, the Examiner maintains a *prima facie* case of anticipation in view of the reference evidence, as applied to claim 20. Based on the totality of the record, including due consideration of Applicants' arguments, the Examiner determines that the preponderance of evidence weighs most heavily in favor of anticipation within the meaning of 35 USC section 102 as applied to claim 20, and obviousness within the meaning of section 103(a), as applied to claims 1, 3-5, 8, 9 and 21-23.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action (as applied to the amended claims). Note that the rejection of claim 20 was maintained given that claim 20 was unamended.

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Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William J. Klimowicz whose telephone number is (703) 305-3452. The examiner can normally be reached on Monday-Thursday (6:30AM-5:00PM).

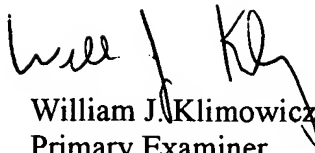
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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William J. Klimowicz  
Primary Examiner  
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WJK